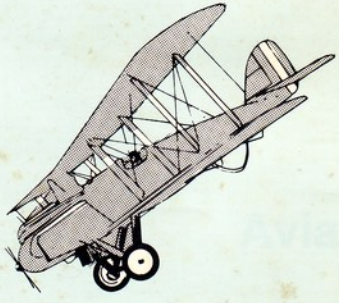
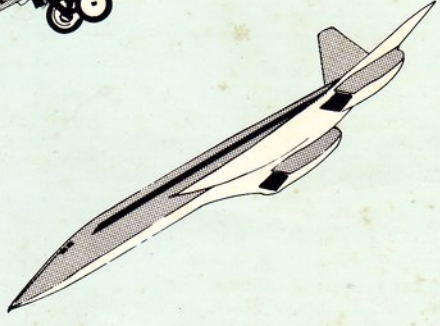
AVIATION PROGRAM

AVIATION





Cat. No. 26-3513

T.M.

Radio Shack®

TRS-80

POCKET COMPUTER SOFTWARE

INSTRUCTION MANUAL

Aviation

Radio Shack®
A DIVISION OF TANDY CORPORATION
FORT WORTH, TEXAS 76102

First Edition

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Introduction

The Aviation Package is a collection of commonly used aviation calculations and conversions. All the programs are stored in the Pocket Computer and are available for immediate use. Even if the computer has been turned off, the programs (and data) will remain in the computer's memory.

Features

Converts

- Temperature from Centigrade to Fahrenheit.
- Temperature from Fahrenheit to Centigrade.
- Statute Miles to Nautical Miles and Kilometers.
- Nautical Miles to Statute Miles and Kilometers.
- Kilometers to Statute Miles and Nautical Miles.
- U.S. Gallons to Imperial Gallons and Liters.
- Imperial Gallons to U.S. Gallons and Liters.
- Liters to U.S. Gallons and Imperial Gallons.

Calculates

- True Altitude, using Pressure Altitude, Temperature, and Reference Altitude.
- True Airspeed, using Pressure Altitude, Temperature, and Indicated Airspeed.
- Mach Number, based on True Airspeed and Temperature.
- True Airspeed, based on Mach Number and Temperature.
- Off-Course Correction and Drift Angles.
- True Heading and Ground Speed with Winds.
- Enroute Winds.

Operating the Program

All of the calculations and conversion formulas are stored in the pocket computer at the same time. Each formula can be called by pressing (SHFT) and the appropriate key.

The program package includes a special plastic overlay which fits over the bottom two rows of keys. The overlay describes the special function that has been assigned to the key. For example, (SHFT)(Z) will now calculate True Airspeed (TAS), based on a Mach figure. (SHFT)(A) will calculate True Altitude, etc.

The AVPACKI Program is loaded and operated in the DEF mode. Be sure the computer is inserted in the Interface and the tape recorder plugs are connected correctly. Turn on the Pocket Computer and press the (MODE) key until DEF appears on the display.

Load the tape and set the recorder to "PLAY". Type
(C)(L)(O)(A)(D)(")(A)(V)(P)(A)(C)(K)(I)(")
and press (ENTER). You will hear the program as it loads into the computer. When the program is loaded into the computer, the tape will stop and the computer will show a > on the left side of the display. You are now ready to use the AVPACKI Program.

Once a calculation or conversion is completed, the answer is stored in one of 26 variable locations, A-Z. These keys are not the same as the SHIFTed keys. For example, the answer to a True Air Speed calculation (found with (SHFT)(V)) is stored in the computer's "Z" register. To recall the answer to a True Air Speed calculation, you would press (Z) and (ENTER), rather than recalculate the TAS.

To provide you with maximum flexibility, all the results of calculations and conversions are stored in the 26 variable registers for later use. New answers or calculations will automatically replace the previously stored answers. A list of the Variable Storage Keys and the information each contains is shown in Appendix E.

Using the Conversion Programs

These eight programs let you convert from one unit of measure to another. Each program is accurate up to five decimal places, although the computer will display only one decimal place for rapid reading of conversions. The full accuracy can be seen by simply pressing the appropriate storage register key and then pressing (ENTER). (See Appendix E.) To convert a measure:

1. Type the number that you want to convert.
2. Press the (SHFT) key.
3. Press the appropriate key for the conversion.
4. After a short pause, the conversion will be displayed.
5. Use the conversion in a calculation by pressing (SHFT) and the appropriate calculation program key.

Example 1—Converting Fahrenheit to Centigrade

Problem: What is 212° Fahrenheit in Degrees Centigrade?

Procedure:

1. Type (2)(1)(2).
2. Press the (SHFT) key. Press the (F) key (°F to °C on the plastic overlay).
3. After a short pause, the display will show: 100.0 :C.
4. Using Appendix E, press (F) and (ENTER) to see the original 212° Fahrenheit entry.
5. Press (T) and (ENTER) to see the Centigrade conversion.
6. The T and F register will store these numbers until they are replaced by any future numbers or erased.

The following conversion programs are available:

(SHFT)(F) — Converts Fahrenheit (:F) into Centigrade (:C).
(SHFT)(C) — Converts Centigrade (:C) into Fahrenheit (:F).
(SHFT)(M) — Converts Statute Miles (:M) into Nautical Miles (:N) and Kilometers (:K).
(SHFT)(N) — Converts Nautical Miles (:N) into Statute Miles (:M) and Kilometers (:K).
(SHFT)(K) — Converts Kilometers (:K) into Statute Miles (:M) and Nautical Miles (:N).
(SHFT)(G) — Converts U.S. Gallons (:G) to Imperial Gallons (:B) and Liters (:L).
(SHFT)(B) — Converts Imperial Gallons (:B) to U.S. Gallons (:G) and Liters (:L).
(SHFT)(L) — Converts Liters (:L) to U.S. Gallons (:G) and Imperial Gallons (:B).

Practice Conversion Problems

°F	°C	STATUTE MILES	NAUTICAL MILES	KILO METERS	US GALLONS	IMP GALLONS	LITERS
?	0	150	?	?	114	?	?
− 10	?	?	120	?	?	100	?
22	?	?	?	185	?	?	2000
?	− 5	?	?	300	58	?	?
?	− 55	?	240	?	?	21	?
?	100	188	?	?	?	?	200

Answers to Preceding Problems

°F	°C	STATUTE MILES	NAUTICAL MILES	KILO METERS	US GALLONS	IMP GALLONS	LITERS
32			130.2	241.3		94.9	431.5
	− 23.3	138.1		222.2	120		454.6
	− 5.5	114.9	99.8		528.3	439.9	
23		186.4	161.9			48.2	219.5
− 67		276.3		444.4	25.2		95.4
212			163.2	302.5	52.8	43.9	

Other Conversions

The Pocket Computer is capable of many types of conversions, using the DEF mode. Using just a few common equivalents, you can greatly increase the conversion capability of the Pocket Computer. Here are important equivalents you will need to remember:

60 Seconds	=	1Minute
60 Minutes	=	1Hour
60 Minutes	=	3600 Seconds
Miles per Hour	=	Miles divided by Hours
Gallons per Hour	=	Gallons divided by Hours
Miles per Gallon	=	Miles divided by Gallons

Example 2—Time/Distance/Speed

Problem: An aircraft flys 400 Statute Miles from its departure to its destination. The time in flight is 2 hours and 40 minutes. What was the average speed of the aircraft during the flight?

Distance	=	400 miles
Time	=	2 hours and 30 minutes
Speed	=	?

Procedure

The computer should be in the DEF mode. Type the following equation: (4) (0) (0) (/) (D) (E) (G) (2) (.) (4) (0).

Here is the sequence the computer uses to analyze the problem.

DEG2.40—The DEG in front of the time (entered as HH.MM) tells the computer to convert the number to hours and decimal fractions of an hour (2.6666667 hrs). If you enter DEG2.30 (2 hours and 30 minutes), the DEG function will convert it to 2.5 hours.

Now the computer will divide 400 by 2.6666667 (Distance divided by Flight Time).

To see the answer, press the (ENTER) key. The display shows: 150.

This is the result in miles per hour. When you enter a time figure for use in an equation, use the DEG function, whole hours, decimal point, then minutes. For example; 35 hours and 25 minutes would be entered as (D) (E) (G) (3) (5) (.) (2) (5).

The computer will always require time to be converted to hours and decimal fractions. If the answer is in units of time, it will be shown as hours and decimal fractions of an hour. [To convert a time answer into hours and minutes, precede the problem with DMS(problem) i.e. DMS(120/130)]

The next page contains some sample problems to assist you in solving many typical in-flight calculation problems. The answers also include the general formulas used to solve the specific problem.

Sample Problems

	DISTANCE	FUEL USED	TIME	SPEED	FUEL RATE	FIND THE
1	140 MI		1 HR	?		SPEED?
2		6 GAL	1 HR 30 MIN		?	FUEL RATE?
3	120 MI		?	60 MPH		TIME?
4		120 GAL	?		14 GPH	TIME?
5	?		1 HR 15 MIN	120 MPH		DISTANCE?
6		?	2 HR		6 GPH	FUEL USED
7	120 NM		1 HR	? KTS		SPEED (KNOTS)
8		?	2 HR		24 LPH	FUEL (LITERS)
9	120 KM		?	130 KPH		TIME

The answers are on the next page.

Answers to Preceding Problems

	DISTANCE	FUEL USED	TIME	SPEED	FUEL RATE	SOLUTIONS
1				140MPH		140/1
2					4 GPH	6/DEG 1.30
3			2 HR			120/60
4			8.57 HR *			120/14
5	150 MI					120•DEG 1.15
6		12 GAL				2x6
7				120KTS		120/1
8		48 LIT				24x2
9			.92 HR *			120/130

* Precede the problem with DMS (problem). For Example 4, (D)(M)(S)(.)(1)(2)(0)(/)(1)(4)(.) = 8.3417 (which means 8 hrs. 34 min. 17 sec). The full answer to the fourth problem is 8 hours and 34 minutes. The answer to the last problem is 55 minutes and 23 seconds.

Equations to Remember

Speed = Distance divided by Time
Distance = Speed multiplied by Time
Time = Distance divided by Speed
Fuel Rate = Fuel Used divided by Time
Time = Fuel Used divided by Fuel Rate
Time = DMS (Hours plus Decimal Fractional Hour)
Time = DEG (Hours plus Minutes)

Using the Calculation Programs

AVPACK provides many calculations which are vital to private pilots. Unlike the Conversion Programs, Calculation Programs will request specific information first. (Remember, in the Conversion Programs, you entered the number first, and then the required conversion.)

Press (SHFT), then the letter key for the desired program. The computer will request the information it needs. Under the following program descriptions, information requests are shown in parentheses. The calculation programs include:

(SHFT)(A) — Calculate True Altitude in feet (TA(FT)) from Pressure Altitude in feet (PA(FT)), Temperature in degrees Centigrade (TEMP(:C)), and the altitude of a nearby ground station in feet (RA(FT)).

(SHFT)(V) — Calculate True Airspeed (TAS) from Pressure Altitude in feet (PA(FT)), Temperature in degrees Centigrade (TEMP(:C)), and Indicated Airspeed (IAS). The True Airspeed will be shown in the same units as Indicated Airspeed.

(SHFT)(X) — Calculate Mach number given True Airspeed (TAS) in Miles per hour and Temperature in degrees Centigrade (TEMP(:C)).

(SHFT)(Z) — Calculate True Airspeed (TAS) in Miles per hour given Mach number and Temperature in degrees Centigrade (TEMP(:C)).

(SHFT)(D) — Calculate Drift and Off-Course correction angles given the Distance Off-Course (DOC), Distance Flown (DF), and the Distance Left to Fly (DTF), Results are Angle to Intercept, Angle to Parallel, and Drift Angle.

(SHFT)(H) — Calculate the Heading relative to True North, i.e. True Heading (TH), the airplane must use to correct for Wind Drift and Ground Speed (GS), of the aircraft.

(SHFT)(J) — Calculate Enroute Wind direction and Speed based on the True Heading (TH), Ground Speed (GS), the planned True Course (TC), and the True Airspeed (TAS), to be used.

Once you enter a variable number (such as temperature), the computer will keep the number to use for other calculations. For example, if you entered a Temperature Conversion, you need not enter the temperature in the above calculations.

The computer has stored the temperature in Fahrenheit (Register F) and Centigrade (Register T). To use the stored temperature, press the (ENTER) key when the program requests temperature. The program will display the current contents of the register that is needed and continue with the calculation.

Calculate True Altitude

The Altimeter in an aircraft operates strictly on the basis of pressure variations. It will not compensate for atmospheric variations due to temperature. (SHFT)(A) lets you get a "True Altitude" estimate, based on the aircraft's current pressure altitude (PA(FT)), the outside temperature in °C (TEMP(:C)), and the Altitude of a nearby reference point (RA(FT)).

The program assumes that, in a standard atmosphere, the temperature will change at a constant rate of 1.9812 degrees Centigrade for each 1000 feet of altitude.

Example 3—True Altitude Calculation

1. Press (SHFT)(A).
2. The program will request pressure altitude in feet: PA(FT)?___.
3. Enter a pressure altitude of 8500 feet. Type (8)(5)(0)(0) (ENTER).
4. The program will request the current outside temperature in degrees Centigrade by displaying: TEMP(:C)?___.
5. Enter a temperature of − 20 degrees Centigrade. Type ⊖(2)(0) and press (ENTER). (If you had previously entered the correct temperature in a conversion, you would simply press (ENTER).)
6. The program will ask for the altitude of a ground based reference point: RA(FT)?___.
7. Enter a Reference Altitude of 5000 feet. Type (5)(0)(0)(0) (ENTER).

After a short pause, the results of the calculation will be displayed: 8265.6 FT = TA.

The current True Altitude is 8,265.6 feet—over 200 feet lower than the indicated altitude due to the unusually low temperature of − 20 °C.

Calculate True Airspeed

The Airspeed indicator, like the Altimeter, is a pressure sensing device. It must be corrected for the Pressure Altitude and Temperature at which a reading is taken.

The program assumes that the True Airspeed (TAS) and the Indicated Airspeed (IAS) are equal only under standard conditions; sea level, 15° C temperature, and 1013.2 millibars of atmospheric pressure (or 29.92 inches Hg barometric pressure).

Example 4—True Airspeed Calculation

1. Press (SHFT)(V).
2. Pressure altitude is requested: PA(FT)?__
3. Enter (8)(0)(0)(0) feet.
4. The program requests the current Temperature: TEMP(:C)?__.
5. Use the currently stored temperature of − 20° by pressing (ENTER) or enter (−)(2)(0).
6. The program will ask for the Indicated Airspeed: IAS?__.
7. Enter an Indicated Airspeed of 120 MPH. Type (1)(2)(0) (ENTER).

After a pause, the program will display: 130.5 = TAS. The True Airspeed will use the same units as the Indicated Airspeed. Since MPH was used for IAS, the TAS answer is also in MPH. The True Airspeed is 130.5 MPH—10 MPH faster than the Indicated Airspeed.

Calculate Mach Number from True Air Speed

The Mach number is a ratio of the aircraft's True Airspeed to the speed of sound. Since the speed of sound in air varies primarily due to temperature, Pressure Altitude is not a required function for this calculation.

Example 5—Mach Number Calculation

1. Press (SHFT)(X).
2. The program will request temperature: TEMP(:C)?___.
3. Enter a temperature of ⊖(1)(5) degrees Centigrade.
4. The program will request True Airspeed: TAS IN MPH?___.
5. Enter (2)(1)(0) MPH as True Airspeed. (See Note.)

After the short pause required for calculations, the computer will display the results: MACH = 0.291 which is almost 3/10 the speed of sound.

Calculate True Air Speed from Mach Number

True Airspeed can be calculated given the Mach number and the current outside temperature. This calculation can be used as a cross check on the Airspeed Indicator when a Machmeter is available.

Example 6—TAS from Mach Calculation

1. Press (SHFT)(Z).
2. The program will request temperature: TEMP(:C)?___.
3. Enter a temperature of ⊖(1)(5) degrees Centigrade.
4. The program will request the Mach number: MACH?___.
5. Enter a Mach number of .291, type ·(2)(9)(1) (ENTER).

After a short pause, the computer will display:
209.6 MPH = TAS.

You may have noticed that the same numbers were used in Example 5, but the answer is now slightly different. Here is the reason. When the numbers were entered in Example 5, the Mach number was shown as 0.291. That was a rounded-off calculation. The actual full answer to Example 5 was .2914239202.

The number was truncated for the display in Example 5, but the full answer was stored in Register C. If you had used Register C as the Mach number in Example 6 (by pressing (ENTER) instead of entering .291), the TAS will be 210 MPH.

Calculate Off-Course Correction

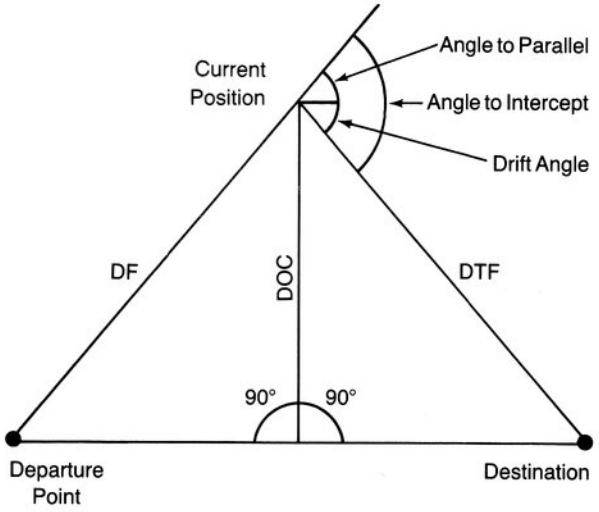
During a long distance flight, it is often necessary to correct for local conditions or change destinations. Any departure from the original flight plan can be considered an "Off-Course Correction". The course correction program gives you a quick means of obtaining the required correction angles with a minimum of effort.

The Off-Course Correction Program will require the following information:

Distance Off-Course (DOC)—The straight line minimum distance between the current aircraft position and the planned course. The DOC line will intersect the planned course at 90°.
Distance Flown (DF)—The straight line distance between the point of departure and the current position of the aircraft.
Distance to Fly (DTF)—The straight line distance between the aircraft's current position and the Planned Destination.

The program will supply the following results:

Angle to Intercept (ATI)—The angle you must add or subtract to intercept the original course at the destination.
Angle to Parallel (ATP)—The angle you must add or subtract to plot a new course that is parallel to the original course.
Drift Angle (DA)—The angle formed between a parallel course and a course that will intercept the original course at the destination.



Example 7—Off-Course Correction Calculation

1. Press (SHFT)(D).
2. The program requests the Distance Off-Course: DOC?___.
3. Enter (3)(0) miles as the Distance Off-Course.
4. The program will ask for the Distance Flown: DF?___.
5. Enter (2)(4)(4) miles for the Distance Flown.
6. The program will request the Distance left to Fly: DTF?___.
7. Enter (1)(0)(5) as the remaining distance.

The program will supply the first calculation after a pause: ATI = 23.6.

The angle necessary to intercept the original course is 23.6 degrees. Depending on which side of the course the drift has occurred, you will subtract or add this angle to the original heading.

Press the (ENTER) key to see the next calculation: ATP = 7.0.

This is the angular correction required to achieve a Parallel Course.

Press (ENTER) again to see the next calculation: DA = 16.6.

This is the Drift Angle. The Drift Angle (DA) plus the Angle to Parallel (ATP) will always equal the Intercept Angle (ATI).

Calculate True Heading and Ground Speed

Allowances must usually be made for wind drift and ground speed variations during a normal planned flight. This is the most common problem area in private pilot navigation. The AVPACKI program provides a clean, efficient solution.

You must provide the following information:

True Course (TC)—The direction of travel (relative to True North) which will be followed to move from the departure point to the destination.
True Airspeed (TAS)—The planned Airspeed which will be maintained during the flight.
Wind Direction (WD)—The angle (relative to True North) from which the wind will be blowing.
Wind Speed (WS)—The wind speed that will be affecting the aircraft during flight.

The computer will then display the resultant calculations:
True Heading (TH)—The heading the aircraft must maintain (relative to True North) to compensate for the wind.
Ground Speed (GS)—The speed of the aircraft relative to the ground when the wind vector (parallel to the course of the aircraft) is taken into account.

Example 8—True Heading and Ground Speed Calculation

1. Press (SHFT)(H).
2. The program will request the planned True Course: TC?___.
3. Enter (5)(0) degrees as the planned True Course.
4. The program will ask for the planned True Airspeed: TAS?___.
5. Enter (1)(5)(0) MPH as the planned True Airspeed.
6. You will be asked for the Wind Direction: WD?___.
7. Enter (1)(9)(1) degrees as the direction the wind is coming from.
8. The last request will be for the current Wind Speed: WS?___.
9. Enter (2)(1) MPH as the speed of the wind blowing from 191°.

After the customary pause, the computer will display the Ground Speed and True Heading: 165.7 = GS 55.0 = TH.

Since the True Airspeed was in MPH, the Ground Speed will also be in the same units, MPH.

Calculate Enroute Wind Vector

This program is used to determine the Wind Direction and Speed while flying between two points. The program is similar to True Heading and Ground Speed. The terminology is directly applicable.

The program will request the following information:

True Course (TC)
True Airspeed (TAS)
True Heading (TH)
Ground Speed (GS)

The program will calculate:

Wind Direction (WD)
Wind Speed (WS)

Example 9—Enroute Wind Vector Calculation

1. Press (SHFT)(J).
2. The planned True Course is requested: TC?___.
3. Enter (5)(0) degrees as the planned True Course.
4. The program will ask for the planned True Airspeed: TAS?___.
5. Enter (1)(5)(0) MPH.
6. The True Heading will be requested: TH?___.
7. Use a True Heading of (5)(5) degrees.
8. The last request will be Ground Speed: GS?___.
9. Enter a Ground Speed of (1)(6)(5)(.)(7) MPH.

After the pause, the computer will display the Wind Speed and the Wind Direction: 20.8 = WS 191.2 = WD.

Note: This was a rework of Example 8, with the Wind Direction and Wind Speed as the unknowns. The difference in the values obtained is due to the displayed accuracy only. To check, redo this problem using GS = 165.592396 and TH = 55.00632769. The answers will match the values used in the previous example.

Appendix A — Backups

A Backup is a tape copy of a program and is an extremely effective method of insuring that an accident or equipment fault will not result in the loss of software. Your first action as owner of the Aviation Package should be to make working copies of the original cassette(s) and then put the originals away in a safe place. Although it may be possible to make direct copies using two cassette recorders or on cassette duplicating equipment, the most RELIABLE method is to use the computer itself to make the Backups. Here are step-by-step instructions for making a Backup:

1. Connect the Cassette Interface to the cassette recorder and install the computer in the Cassette Interface.

2. Place the cassette containing the program(s) to be copied in the recorder and either rewind the tape to the beginning or position the tape to a blank area just prior to the desired program. Place the recorder in the "PLAY" mode.

3. Turn on the computer, make sure that it is either in the DEF or RUN mode and type in:
CLOAD"name" ("name" is the name of the program to be copied).

4. When the program has been loaded into the computer and the cassette has stopped, remove the cassette and replace it with the cassette which is to receive the program copy. Either rewind the tape to the beginning or position it to the point where the copy is to start. You should leave about ten seconds of blank tape if the copy is to start at the beginning of the cassette or about five seconds of blank space if the copy is to follow another program on the same cassette. Place the recorder in the "RECORD" mode.

5. Make sure that the computer is in either the DEF or RUN mode and type in: CSAVE"name"

The recorder will start and record your program.

6. Now rewind the cassette to the blank space just prior to the program, put the recorder into the "PLAY" mode and type in: CLOAD?"name".

This is the computer's verifying function and the recorder will start and compare the cassette copy with the program in the computer's memory. If the copy is good, the recorder will stop at the end of the program and the > prompt will re-appear on the display. If an error occurred during the verification, you'll get an error display such as: 5. . . . . .

If this happens, check the recorder volume setting and try the CLOAD? function once more. If you still get an error, the tape copy is probably bad and you should CSAVE the program once again and re-verify it. You may find that some brands of tape, especially the cheaper brands may not be of sufficient quality to insure reliable copying. Radio Shack Supertape or TRS-80 certified cassettes are recommended for best results.

7. Repeat Steps 1 through 6 for each program to be Backed-up.

8. Put the original cassettes away in a safe place and use them ONLY for making working copies.

Appendix B — Maintenance

Maintenance of your Pocket Computer System is not difficult and attention to the simple points listed below should provide best reliability and satisfaction:

1. Keep your program cassettes in their boxes when not in use and don't expose them to extremes of temperature or magnetic fields. **NEVER** touch the exposed surface of the tape on the front edge of the cassette.

2. Clean and demagnetize the tape heads in the recorder at regular intervals. Follow the recommendations in the cassette recorder's manual.

3. Experience has shown that best program loading and saving reliability is achieved by operating the cassette recorder on batteries rather than AC.

4. Use only fresh alkaline type batteries in the recorder and Cassette Interface.

5. Always press the recorder's "STOP" key immediately after loading or saving a program. This will release the pressure on the rubber roller which pulls the tape so that the roller will not develop a permanent "flat" at the point of contact with the tape.

6. **ALWAYS** turn the computer OFF before installing it in, or removing it from the Cassette Interface.

7. After removing the computer from the Cassette Interface, be sure to re-install the protective plug to keep dirt out of the connector on the computer. Never touch the exposed contacts on the Cassette Interface.

Appendix C—Summary of Function

(SHFT)(SPC) — Displays the package title and date.
(SHFT)(A) — True Altitude Calculation.
(SHFT)(B) — Converts Imperial Gallons to U.S. Gallons and Liters.
(SHFT)(C) — Converts temperature in °C to °F.
(SHFT)(D) — Off-Course Correction Calculation.
(SHFT)(F) — Converts temperature in °F to °C.
(SHFT)(G) — Converts U.S. Gallons to Imperial Gallons and Liters.
(SHFT)(H) — Calculates True Heading with Wind.
(SHFT)(J) — Calculates Enroute Wind Vector.
(SHFT)(K) — Converts Kilometers to Statute and Nautical Miles.
(SHFT)(L) — Converts Liters to U.S. and Imperial Gallons.
(SHFT)(M) — Converts Statute Miles to Nautical Miles and Kilometers.
(SHFT)(N) — Converts Nautical Miles to Statute Miles and Kilometers.
(SHFT)(S) — Not Implemented—Synonym for (SHFT)(SPC).
(SHFT)(V) — Calculates True Airspeed.
(SHFT)(X) — Calculates Mach number from True Airspeed.
(SHFT)(Z) — Calculates True Airspeed from Mach number.

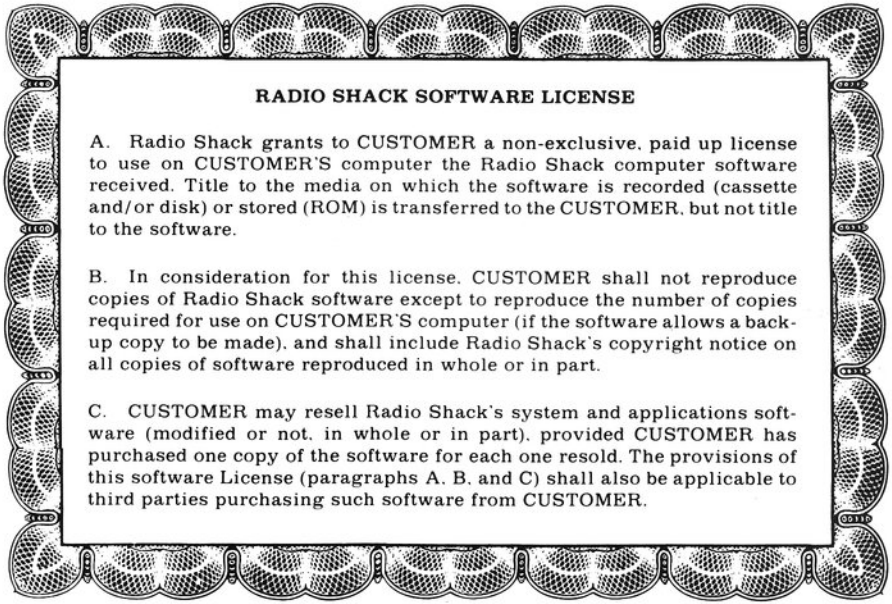
Appendix D—List of Abbreviations

AVPACKI — Name of this software package.
:C — Degrees Centigrade
DF — Straight line Distance Flown from departure to current position.
DTF — Straight line Distance to Fly from current position to intercept point of the planned Course (destination).
DOC — Straight line minimum distance from current position to the planned course (eq: Distance Off-Course).
:F — Degrees Fahrenheit
FT — Feet
GAL — U.S. Gallon
GS — Ground Speed
IAS — Indicated Airspeed
IGAL — Imperial (British) Gallons
KM — Kilometer
L — Liter
MI — Statute Miles (eq, 5280 feet)
MACH — Mach Number
MPH — Statute Miles Per Hour
NM — Nautical Miles
PA(FT) — Pressure Altitude in feet (eq, The indicated Altitude when the Altimeter window is set to 29.92 inches of Mercury).
RA(FT) — Reference Altitude in feet. This is normally the actual altitude of a nearby ground station or map coordinate.
STD. TEMP — The Standard Temperature at a Specified Pressure Altitude.
TA — True Altitude. Pressure Altitude corrected for local temperature.
TAS — True Airspeed. Indicated Airspeed which has been corrected for local temperature and current pressure altitude
TC — True Course relative to True North
TEMP(:C) — Temperature in degrees Centigrade.
TH — The heading of the aircraft relative to True North (eq, True Heading).
WS — The speed of the Wind.
WD — The direction from which the measured wind is blowing.
ATI — Angle To Intercept. This is the total angle which must be applied to the current course in order to intercept the planned course at the destination.
ATP — Angle to Parallel. This is the correction angle which must be applied to the current course to parallel the planned course.
DA — Drift Angle. This is the angle between the parallel course and the intercept course.

Appendix E—Variable Assignments

Register	Stored Data
(A)	Speed of Sound at Temperature T(°C)
(B)	Liquid Measure in Imperial Gallons
(C)	Mach Number
(D)	Angle to Parallel Course
(E)	Distance off course
(F)	Temperature in °F
(G)	Liquid Measure in U.S. Gallons
(H)	Pressure Altitude in feet
(I)	Wind Speed
(J)	Wind Direction
(K)	Distance in Kilometers
(L)	Liquid Measure in Liters
(M)	Distance in Statute Miles
(N)	Distance in Nautical Miles
(O)	True Course in degrees Relative to True North
(P)	Distance To Fly
(Q)	Distance Flown
(R)	Reference Altitude in feet
(S)	Standard Temperature at Altitude in °C
(T)	Temperature in °C
(U)	Ground Speed
(V)	Indicated Air Speed
(W)	Drift Angle

Register	Stored Data
(X)	True Heading in degrees Relative to True North
(Y)	True Altitude in feet
(Z)	True Air Speed



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U.S.A.: FORT WORTH, TEXAS 76102
CANADA: BARRIE, ONTARIO L4M 4W5

TANDY CORPORATION

AUSTRALIA	BELGIUM	U. K.
280-316 VICTORIA ROAD RYDALMERE, N.S.W. 2116	PARC INDUSTRIEL DE NANINNE 5140 NANINNE	BILSTON ROAD WEDNESBURY WEST MIDLANDS WS10 7JN

PRINTED IN USA 8/80